



Observational Study of Blood Groups Distribution Among Medical Students in Central India

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ABSTRACT

Background: The ABO and Rhesus (Rh) blood group systems are clinically most important compare to other systems. Acquaintance of the geographical and ethnicity wise distribution of ABO and Rh blood group is necessary for operative management of blood banks, transfusion medicine and genetic research.

Aims: This Study was designed to collect data on ABO and Rh distribution among medical students who are natives of central India and its comparison with similar Indian studies.

Materials and Methods: Study was accomplished on 192 first and second year medical students belongs to central India (Madhya Pradesh) in the Department of Physiology NSCB Medical College Jabalpur, M.P. The blood samples were collected by finger prick method. ABO blood grouping and Rhesus factors (Rh) typing were decided by glass slide method.

Results: Among these medical students the maximum prevalent blood group was B (35.33%) followed by O (34.95%), A (21%) and AB (08.72%). Rh positive prevalence among these students was 96.32%.

Conclusion: The study endorsed that blood group B is the commonest of the ABO blood group system in central Indian population and the AB blood group is the least. Rhesus positive is much commoner than Rhesus negative among them.

Keywords: ABO Blood Groups, Rh, central India, Medical Students.

Introduction

ABO and Rhesus (Rh) blood group systems till today remain clinically most important in spite of being identification of around twenty nine blood group systems, enumerated by International Society of Blood Transfusion. In 1900, Karl Landsteiner detected the human ABO blood group.¹ The Rh blood group system was discovered during 1939–1940 by Landsteiner, Weiner, Levine and Stetson, clarifying the basis of many unpredicted transfusion reactions. In 1945, Coombs, Mourant and Race described the use of antihuman globulin (Coombs test) for incomplete antibodies.² Later these two systems have substantiated to be the most important in transfusion medicine. Today, the requirement for blood group frequency and its prevalence is multiuse, besides their importance in relation to blood transfusion and organ transplantation. Blood group antigens can also be applied in genetic research, forensic pathology, anthropology and ancestral evolution of human.³

Nowadays, the ABO blood groups display an extensive geographical variation and vary noticeably, both within and among ethnic groups. Hence, the knowledge of blood group distribution in diverse population is for utmost importance in health care and transfusion practices.⁴

Knowledge of blood group distribution is vital for clinical studies as it provides information of dependable geographical region and it will aid a lot in genetic studies of such population. Knowledge of blood grouping provides access to safe supply of blood which will help significantly in reducing the preventable deaths. Therefore, it is relevant to have statistics on the frequency distribution of these blood groups in any population group.

Material and Methods

This cross sectional observational study conducted over students of central India at the Department of Physiology, NSCB Medical College, Jabalpur in the Period of January to March, 2016. The entire students included in the study group belong to Madhya Pradesh only. After prior informed consent and institutional ethical clearance samples were collected from one hundred ninety two medical students, studying first and second professional MBBS. All medical students, were from various areas of Madhya Pradesh i.e. belongs to regions of Indore, Gwalior, Bhopal, Rewa, Jabalpur, Chindwara, Balaghat and Shadol. The students in the same batches which were from other states of India were excluded from this study. Under a septic preventive

measure by finger prick method non haemolysed blood samples were collected, and non-greasy glass slides was used for identification of ABO blood grouping and Rhesus factors (Rh) typing. Commercially available Tulip diagnostics Eryscreen anti sera A, anti sera B and anti sera D kits were used for this study. Blood samples were treated with anti-A, anti-B and anti-D anti sera over glass slides and mixed uniformly over an area of 2.5 cm by mixing stick. After two minutes of gentle rocking samples were observed for agglutination, both macroscopically and microscopically.⁵

Following Landsteiner laws blood groups and IgG antibodies of Rh system of those students who were identified and their relevant data was entered into Microsoft Excel sheet 2013 and tabulated with graphical representation.

Table 1: Frequency distribution of different blood groups among medical students.

Blood groups	Male (n=132)	Rh pos	Rh neg	Female (n=60)	Rh pos	Rh neg	Total
A	28	27	1	13	13	0	41
B	48	46	2	22	21	1	70
AB	11	11	0	04	3	1	15
O	45	45	0	21	21	0	66

Table 2: Frequency distribution of different blood groups among Muslim medical students.

Blood groups	Total no (n=18)	Percentage	Male	Female
A	2	11.11	2	0
B	8	44.44	5	3
AB	2	11.11	2	0
O	6	33.34	3	3

Discussion

Variables in ABO and Rh D phenotypes are noted broadly across races and geographical boundaries.⁶ Limited studies on the prevalence of ABO and Rh blood groups have been conducted in the Indian population and common studies are limited to particular regions of the country. Very few such studies have yet been reported from central India.

In India, we have many types of ultra-rare phenotypes of blood groups like Bombay (Oh), -D -/-D-, In (a+b-), Colton-null phenotype, Cde/Cde (ryry) phenotypes; those phenotypes are potential enough to pose problems in providing blood to the recipients having these phenotypes.⁷

The present study revealed among medical students of central India having prevalence of blood group B>O>A>AB. A study conducted by Talukdar et al, outside the State in Guwahati revealed blood group O was the

Results

Out of 192 medical students 132 (68.75%) were males and 60 (31.25) % were females with mean± SD age of 19.95±0.85 years. In our study, among all students most prevalent blood group was B, 70 cases (35.33%) followed by O in 66 cases (34.95%), A in 41(21%) cases and AB in 15 cases (8.72%).

Among 192 students 187 (97.39%) showed Rh positive blood group. In Rh-positive cases, among boys AB and O blood group all were Rh positive, while in girls A and O blood groups were Rh positive. Among these students only 3 males and 2 females having Rh negative blood group.

It was also seen that blood group B was more prevalent among Muslims followed by O. All Muslim students showed Rh positive blood group

commonest at 37.23% followed by blood groups B at 31.0%, A at 24.83% and AB at 6.93%.⁸

Studies done in Northern parts of India by Chandra et al at Lucknow and Sindhu et al at Punjab showed blood group B was the commonest, followed by O, A and AB which have similar finding as seen in our study. In western Ahmedabad, Patel et al carried a hospital based study predominantly among male donors and reported the commonest ABO blood was B (39.40 %) followed by O (30.79 %), A (21.94 %) and AB (7.86 %) . In this present study among student similar findings were seen with B as most prevalent (35.33%) blood group followed by O (34.95%), A (21%) and AB (8.72%). A study done in Durgapur of West Bengal by Nag et al found that commonest blood group was O followed by B, A and AB, different from our study.^{9,10,11,12}

The present study pointed that blood group B and O were also common in distribution among the female study group

followed by the A and AB. Study done in North India by Chandra et al displayed among female blood donors the B positive blood group was most prevalent.⁹

A study carried on the distribution of blood groups among south Indian medical students of the Great Eastern Medical School, Andhra Pradesh by Swamy et al showed O was the commonest blood group in both sexes, but in this study among male students the commonest blood group was A and female students the maximum prevalent blood groups were A and B.¹³

The Rhesus blood group is the most polymorphic and its medical implication in transfusion medicine is only next to the ABO blood group system. Multicentric study in India by Agrawal et al revealed 94.61% of the donor population was Rh positive and the rest were Rh negative, similar to present study where 97.39% students were Rh positive and rest 2.61% were Rh negative. Study conducted by Parmanik et al over Nepalese medical students, in Nepal medical college, Kathmandu exhibited 96.66% Rh positive cases which was consistent finding with our study.^{14, 15}

A study conducted by Hussain et al among North Indian Muslim population highlighted the most frequent blood group was found to be group O 29.97% followed by A 26.52%, B 20.03% and AB 19.34%.¹⁶

An epidemiological study in relation to Muslim and Christian communities of Kheda, Gujarat by Pant et al showed Blood group B was dominant in both the communities, having similar to our present study which shows that in medical students both B and O blood group were prevalent.¹⁷

A study done over 152 medical students in Davangere, Karnataka by Hemlatha et al published the most common blood group was O (41.5 %) followed by B group (32.2 %), A group (19%) and least being AB group (7.2%). Among the Rh blood group, 94% students were Rh positive, however only 6% were Rh negative. In this study among all one hundred medical students A, B and O blood groups were seen in equal proportion, each in 30 % cases and least being AB group (10%) and Ninety seven percentage students were Rh positive.¹⁸

Conclusion

We noted that ABO and Rhesus 'D' blood group distribution diverged in different parts of India. The study highlights similar frequency of distribution of A, B and O blood group among students and B is the most prevalent blood group among central Indian population. Rhesus positive is much more common than Rhesus negative among this population as well as in respect to Indian population.

The knowledge of blood group distribution is important for clinical studies, for reliable geographical information and blood bank management. This study would help in developing India-specific reagent cell-panels for antibody screening and identification, which would further aid in the improvement of transfusion services in the country.

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